Accelerating Electric Vehicle Deployment
Opportunities for US-China Joint Initiative

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US-China Electric Vehicles Forum
Beijing, China
September 30, 2009

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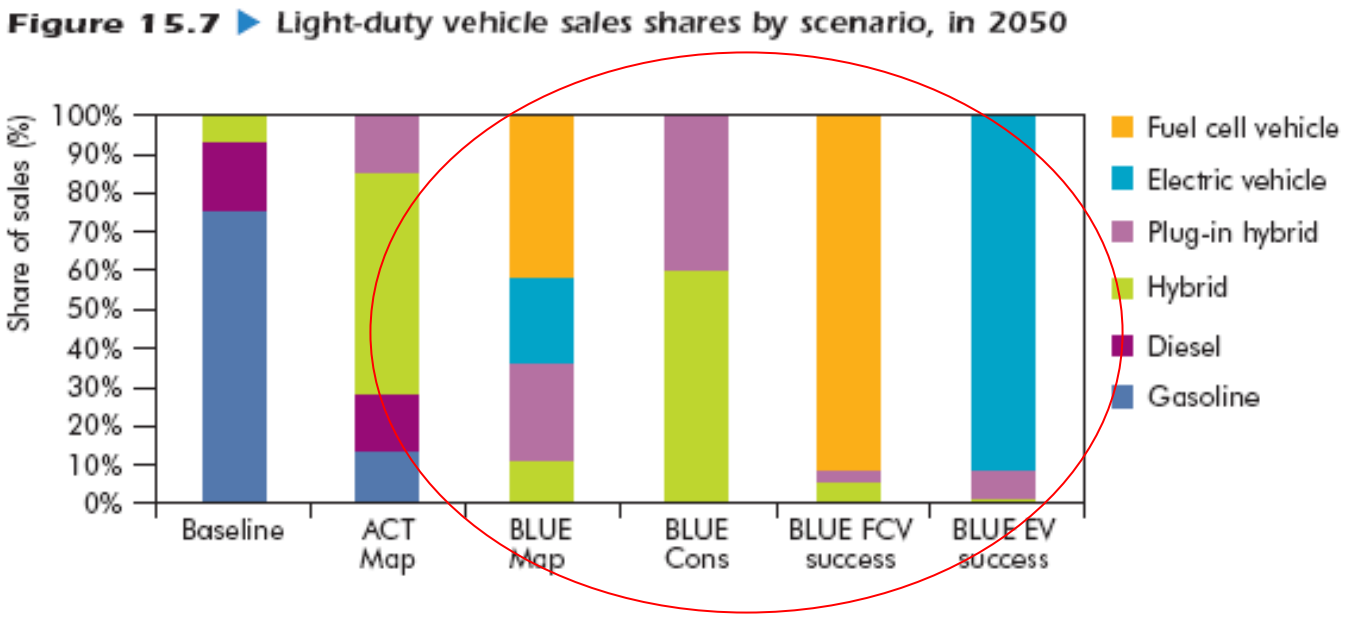
NRDC
THE EARTH'S BEST DEFENSE

The Natural Resources Defense Council

- National Environmental Non Governmental Organization (NGO) founded in 1970
- 350 Lawyers, Scientists and other professionals
- 1.2 million members and activists
- 6 offices: New York, D.C., San Francisco, Los Angeles, Chicago and Beijing
- Beijing Office founded in 1996 and focuses on energy (including transportation), public health and governance

Global EV Goal Requires Large Investments but also Creates Large Opportunities



- IEA "Blue" Scenario Requires 100% Electric Drive Sales by 2050
- Blue Scenarios achieve 50% reduction in global CO_2 by 2050
- 2015 Battery Technology Target: $300/kwh
- RD&D Investment Required, 2005-2035: $74-$97 billion
- Value added to auto market, 2005-2050: $3.95 to $4.5 trillion

3 Key Opportunities for Joint US-China Initiative on Accelerating EV Deployment

1. Research, Development and Demonstration (RD&D)
   - Greater cooperation on key enabling vehicle technologies, especially battery technology
2. Grid Readiness and Integration
   - Ensure grid reliability and minimize energy & environmental impacts
3. Market Creation through Policies and Standards
   - Share best practices and coordinate policies to create stable investment environment

Key Opportunity #1: Research, Development and Demonstration

- Greater cooperation on key enabling vehicle technologies
- Battery technology: Single most critical component
  - Lithium ion technology still unproven in long term use
- Other key EV drivetrain technologies
  - Electric motors, power conversion, chargers
- Other: Lightweight materials to help meet consumer expectations for range and performance
- Accelerate “Learning by Doing” by sharing data from early demonstration programs

Key Opportunity #2: Electricity Grid Readiness and Integration

- Coordination on research and policies to ensure grid reliability and minimize energy & environmental impacts
- If done right, EVs can makes use of existing capacity and help renewable electricity become more cost-effective
- Key is to ensure charging occurs predominately off peak
  - Smart grid to enable time of use rates to encourage night charging
  - Telematics for on-demand charging to maximize renewables
- Explore potential for secondary use of vehicle batteries
  - Use of batteries after end of vehicle useful life could provide cheap, off-peak storage for renewable electricity

Key Opportunity #3: Market Creation through Policies and Standards

- Create markets through policies and standards to provide strong, stable global investment environment necessary for private, public and quasi-public (e.g., utilities) sectors
- Share and adopting best practices
  - US: California ZEV program, EPA GHG standards
  - Consumer incentives, including new models for battery leasing
  - Battery recycling
- Develop joint set of recommendations for market creation
  - 2 largest auto markets, combines sales roughly 25 million/yr
  - Coordinated policies can create large economies of scale.

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